Pyrolysis of oil palm empty fruit bunch biomass pellets using multimode microwave irradiation

Abstract :

Oil palm empty fruit bunch pellets were subjected to pyrolysis in a multimode microwave (MW) system (1. kW and 2.45. GHz frequency) with and without the MW absorber, activated carbon. The ratio of biomass to MW absorber not only affected the temperature profiles of the EFB but also pyrolysis products such as bio-oil, char, and gas. The highest bio-oil yield of about 21. wt.% was obtained with 25% MW absorber. The bio-oil consisted of phenolic compounds of about 60-70 area% as detected by GC-MS and confirmed by FT-IR analysis. Ball lightning (plasma arc) occurred due to residual palm oil in the EFB biomass without using an MW absorber. The bio-char can be utilized as potential alternative fuel because of its heating value (25. MJ/kg).